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the Problem of Operationalization

# GUIDO BONINO, PAOLO TRIPODI DISTANT READING AND THE PROBLEM OF OPERATIONALIZATION

*Goldilockean Considerations*

**ABSTRACT:** The paper focuses on the role of operationalization (i.e., the building of models and the setting down of rules of annotation) in quantitative research in the humanities, and especially in the history of ideas. On the one hand, the presence of fully explicit annotation rules and fully operationalized concepts allows one to formulate claims that are clearly verifiable, or falsifiable, or in any case testable. On the other hand, full operationalization seems to have some controversial aspects: is it practically feasible? Is verifiability what we always want to achieve in the humanities? Are operationalized concepts semantically “well-anchored”?

**KEYWORDS:** Distant reading, Operationalization, Verifiability, Goldilocks principle, History of ideas.

## Operationalization and Explication

Some proposals have been recently advanced concerning the role of operationalization (i.e., the building of models and the setting down of rules of annotation) in quantitative research in the humanities, and especially in the history of ideas. On this view, if one aims at inquiring, with quantitative methods, the history of a concept *x*, one has to operationalize the concept *x*, i.e., build a model of the concept *x* itself, in which its different aspects are made completely explicit (at least ideally). In this way one provides annotators (be they human beings or computers) with completely explicit rules, so that they do not need to resort to intuition or common sense in order to accomplish their annotation task.<sup>1</sup>

The advocates of operationalization argue that a thorough explicitness in the operationalization itself is a worthwhile goal to be attained, because in such a way one can formulate claims concerning the operationalized concepts that are clearly verifiable, or falsifiable, or in any case testable. Such

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<sup>1</sup> See, among others, Betti and van den Berg (2014; 2016), Betti *et al.* (2019), Sangiacomo (2019), Ginammi *et al.* (2020). In our own work, namely in Bonino, Maffezoli and Tripodi (2020), we ourselves made an attempt to adopt this methodological approach. For different, though related applications of quantitative methods to the history of ideas, broadly conceived, see for example de Bolla (2013), Petrovich (2018), de Bolla *et al.* (2019), Malaterre, Chartier and Pulizzotto (2019).

verifiability depends on the fact that, working with operationalized concepts, we always know exactly what we are speaking about, so that other researchers know what to do if they want to confirm or disconfirm our claims. The disadvantage of non-operationalized concepts is that they are usually somewhat vague, so that one can only advance vague claims about them, and vague claims are not clearly comparable, verifiable or falsifiable.

As is well known in the philosophy of science, the operationalized concept is presumably different (though hopefully slightly different) from the original, intuitive concept. Operationalization is more or less equivalent, from this point of view, to what Rudolf Carnap called the explication of a concept (Carnap 1950). We start with an intuitive or common sense concept  $x$ , which – like all intuitive concepts – is rather vague, or even somewhat confused, and we try to explicate it, by making it more precise. What we get is the explicated concept  $x^*$ , which is unabashedly different from  $x$ , even if it certainly aims at approximating  $x$ . All that means that there will be – or at any rate that there can be – items that fall under the original, intuitive concept, but do not fall under the explicated one, and vice versa.

Carnap was well aware that in the process of explication something gets lost: we are not really speaking of the concept  $x$  anymore, but rather of the concept  $x^*$  (the nuances of the original concept, for instance, are not considered anymore). Yet there is also a gain: now we have a well-defined concept, that can be easily incorporated into axiomatic systems, or about which we can make rigorously verifiable claims. For example, the common sense concept of salt has been replaced in chemistry by the more rigorously defined concept of NaCl, which is not exactly the same thing, but is certainly better suited to the needs of chemistry. In more or less the same way, a biologist explicates the pre-scientific concept *fish* by replacing it by the scientifically defined concept *piscis*: most of the animals we used to call ‘fishes’ still come out as ‘pisces’, but there are exceptions (for example, a whale, which is a mammal, falls under the everyday concept *fish* but not under the biological concept *piscis*). Yet another example is the intuitive notion of truth, which has been refined by Alfred Tarski into the concept of truth-in- $L$  (where  $L$  is a specific language), thus avoiding some possible difficulties with an unregimented concept of truth; for many purposes truth can be replaced successfully by truth-in- $L$ , though the two concepts are clearly not the same.

It is usually assumed that in most cases the gain is bigger than the loss. In the case of mathematical or formal disciplines such an evaluation is usually made in terms of comprehensiveness, simplicity, fruitfulness with respect to the theorems to be demonstrated, etc. In more empirically-oriented disciplines, the relevant considerations usually concern the greater suitability of explicated concepts to be connected with other concepts belonging to different disciplines (chemical concepts, for instance, can be reduced to physical concepts, and this reducibility is an important requirement for

chemical concepts: *NaCl* easily fits in with the atomic theory of matter, whereas *salt* is too vague).

### A Clarification

As suggested above, the request for fully explicit models and rules of annotation in the history of ideas is usually motivated by epistemological reasons: verifiability, falsifiability, comparability, etc. By contrast, it is to be noticed that it is not motivated by “technical” reasons, that is by the idea that, in order to employ automatic tools (computers) as an aid to the researchers, one necessarily needs this level of explicitness. Assuredly, if one wants the computer to pick out a concept from a text on the basis of a list of necessary and sufficient conditions, then one needs to provide fully explicit rules, since it is not possible to rely on the intuition or common sense, or implicit knowledge of a human distant reader. In this case one would actually need a fully operationalized concept, that is a concept\*. But that is definitely not the only way in which computers can be used in this kind of inquiries. A very common alternative is that of training a program to simulate the judgments of domain experts, which are based on the intuitive (i.e., non-operationalized) concept.

There is a superficial similarity between this case and that in which one makes use of operationalized concepts. In both cases the results will probably be an approximation with respect to the results that could be obtained by the domain experts. But they are an approximation in two completely different senses. In the trained program case, the results are an approximation just by chance; their being an approximation is – so to speak – a mistake, in that the results themselves are good insofar as they are similar to those obtained by the domain experts. The intuitive concept, in other words, is the standard with respect to which we assess the quality of the results. By contrast, when we replace an intuitive concept by an operationalized (explicated) concept\*, the original concept is fully abandoned, and the concept\* wholly takes on its role. Possible disagreements between the results based on the use of the original concept and those based on the explicated concept\* are not an unfortunate mistake, but something that is fully accepted from the beginning, in exchange for other advantages.<sup>2</sup>

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<sup>2</sup> The two cases that have just been contrasted are “ideal” cases: in real life (that is, in most actual investigations), things are more nuanced and sometimes uncertain. Our only aim here is that of making a principle point.

## Operationalization in the Humanities: the Problem of Practical Feasibility

We do not want to object to the desirability of the goals that the advocates of explicitness set to themselves: verifiability, falsifiability, comparability are certainly good things, *per se*.<sup>3</sup> Yet it seems to us that the requirement of full explicitness in the history of ideas can also pose some problems. The first problem is in a way a rather trivial one. It has not to do with a difficulty in principle, but as soon as one thinks of actual examples, the difficulty seems apparent. Consider the following two actual examples, one taken from literary studies, and one from the history of philosophy.

First example. In a famous article, *The Slaughterhouse of Literature*, Franco Moretti focuses – among other things – on a specific device of detective stories: the clue (Moretti 2000). In developing his arguments Moretti needs to distinguish different subclasses of clues: there are (1) non-necessary clues, (2) necessary clues that are non-visible, (3) necessary and visible clues that are non-decodable, and finally (4) necessary, visible and decodable clues. All such kinds of clue were used not only by minor authors, but also by Arthur Conan Doyle himself. The last kind of clue – necessary, visible and decodable – would then turn out successful, becoming paradigmatic for the generation of writers following that of Conan Doyle. For his investigation into the reasons of the success or unsuccess of detective stories, Moretti needs to detect – in a large number of texts – the possible presence of the different kinds of clue. In order for a distant reader to be able to detect them, the very brief definitions provided above are probably not enough. He or she needs some more satisfying explanation of what, for instance, a necessary but non-visible clue is, in order to be able to correctly identify it when occurring in the text. In other words, he or she needs some sort of guidelines. But how much detailed should and can such guidelines be? Is it really possible to provide completely explicit rules, so that the distant reader can – by applying them in a completely automatic way – recognize the different kinds of clue? It seems that one does not even know how to start with the formulation of such wholly explicit rules, which are supposed to make any recourse to intuition or common sense unnecessary.

Second example. It is taken from our paper on *Logic and Analytic Philosophy (1941-2010). A Quantitative Analysis*, recently published in *Synthese* (Bonino, Maffezoli and Tripodi 2020). In this paper we try to quantify the presence of logic in analytic philosophy papers. That means that we had to “distantly read” (that is browse) a huge amount of papers, in order to understand whether some logic was present in them, and possibly what kind of logic. We tried to give ourselves some guidelines, in order to make our

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<sup>3</sup> We ourselves tried to adhere to such methodological recommendations in some of our works (see footnote 1).

judgments as consistent as possible. But we certainly fell somewhat short of completely explicit rules. And we did not have any clear idea as to how make them more explicit. Logic is many things, and it can manifest itself in many different ways. For instance, we wanted to recognize the presence of logic even when no logical symbolism was present; in other words, we wanted to detect the mere presence of logical notions; but of course, notions manifest themselves in texts by means of words. Should we have written down an exhaustive list of logical words, whose presence was to be taken as a signal of the presence of logic? But then, words are often ambiguous. ‘Valid’ is a technical term in logic, but it may also occur in a paper in its ordinary language meaning, which has nothing to do with logic. Should we have formulated explicit (and presumably highly complicated) rules of disambiguation? All that seems well beyond actual feasibility. There is a point at which, if one is pushed towards ever more explicit rules, one is almost tempted to say, with Wittgenstein, that “if I have exhausted the justifications, I have reached bedrock and my spade is turned. Then I am inclined to say: ‘This is simply what I do’” (Wittgenstein 1953, § 217). Thus the problem is: how long must one go in this search for explicitness? On the whole, it seems to us that in these cases – as in many others one could think of – there were very good practical reasons not to aim for complete explicitness.

Some results in the cognitive sciences seem to suggest that the perception of experts in many fields is rarely or never characterized by complete explicitness. Consider for example the so-called chicken-sexers. Confronted with a chick, they find themselves inclined to say “male” or “female”. As a matter of fact, their dispositions are reliable. In these cases the chicken-sexers, as much as the experts in other domains, quickly make inferences from observational features of which they are only partly aware. They were given examples and explicit instructions, but they are not able to provide an explicit justification, in each single case, for their reliable responses (Pylyshyn 1999).<sup>4</sup>

### Do We Always Need Verifiability?

The second problem – contrary to the first one – concerns a principle matter. But in this case we do not really have a straightforward objection. Rather, ours is a sort of uneasiness, or a doubt. Formulated as a doubt, it runs like this: Are we certain that verifiability (or falsifiability) must always be a goal in the humanities, or in the historical disciplines? The humanities often –

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<sup>4</sup> In philosophy and in cognitive science there has been and there is a wide debate on the chicken sexers case, from which many different conclusions have been and can be drawn. It is here mentioned only as a case that is – at least for some aspects – parallel to that under consideration.

or at least sometimes – seem to aim, among other things, at an understanding, or an interpretation of the investigated phenomena. And if our aim is that of understanding the concept  $x$ , defining (in a completely explicit way) the concept  $x^*$  does not seem to make us progress a lot towards that end (this critique was famously raised by P.F. Strawson against Carnap's attempt to achieve conceptual clarity and better understanding in philosophy by replacing ordinary concepts with concepts\*; see Strawson 1963 and Carnap's reply, Carnap 1963). We do not necessarily want to argue in favour of a deeply grounded methodological peculiarity of the *Geisteswissenschaften*, along Dilthey's lines (Dilthey 1883). More humbly, we are just wondering whether the verifiability/explicitness constraint may not be useless with respect to, or even incompatible with such "humanistic" aims as understanding, interpreting, becoming aware. It is worth noting that the problem seems to be especially serious for the history of philosophy. Let us consider an example. Moretti talks of the concept of gothic novel (Moretti 2011). One could try to operationalize the concept, so as to obtain the concept *gothic novel\**. If one is good at operationalizing, *gothic novel\** approximates *gothic novel* rather well, that is, there is little difference between the list of novels that fall under the concept *gothic novel* and those that fall under the concept *gothic novel\**. Yet there is, or there may be, a difference. That is probably not a big problem if what you are really interested in are gothic novels themselves, not the concept of gothic novel, as it was entertained, for instance, by some 19th-century writer.<sup>5</sup> For this latter objective, the concept *gothic novel\** does not seem to be of great use. Now, it seems that in the history of philosophy we are very often interested in concepts as they were entertained by some philosopher. When we investigate the notion of *res cogitans* in Descartes, we are usually not interested in some concept\* whose extension approximates that of Descartes's notion, but rather in the intension of the concept as it was entertained by Descartes. According to a well-known reading, for example, Descartes conceived thought or *cogitatio* very broadly. And that was historically crucial, since the boundaries between mind and body were entirely redrawn, if compared, say, to the views of Aquinas, thus opening the door to the very idea of a disembodied spirit. In such a case, a proper historical-philosophical understanding requires an accurate description of the intensional concept entertained by Descartes (whereas in the case in which we focus on the extension, possibly to find out new and interesting correlations, a small discrepancy is not only allowed but can be fruitful).

Things are certainly more complicated and nuanced than this, and we do not want to claim that this must always be the aim of the history of philosophy. Yet it seems to be a legitimate aim, for the attainment of which

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<sup>5</sup> In fact, as we shall see in the next section, this very difference may be explanatorily fruitful, allowing for the discovery of previously unknown correlations.

the verifiability/explicitness constraints might be a hindrance rather than a help.

### The Anchoring Problem

Let us now grant that the feasibility problem is somehow solved, and that verifiability is accepted as an important methodological requirement. Let us also suppose that, in virtue of this method, we can make interesting discoveries in the history of ideas. A typical case is that in which we find a strong correlation between an operationalized concept, say *clue\**, *logic\**, *gothic novel\**, and some other phenomena, possibly external to the discipline in question. For example, we can speculate that the revised version of *gothic novel*, that is *gothic novel\**, strongly correlates with some social phenomena, and this does not happen in the case of the intuitive, common sense concept (or at least, that in this case the correlation is weaker). That would certainly be an interesting socio-literary finding, that is made possible – or at least easier to discover – by the operationalization. It seems to us that, even in these very favourable circumstances, a further problem arises. In order to satisfy the explicitness/verifiability constraint in a consistent way, all the concepts that are correlated should be operationalized, that is, they should be concepts\*. In our example, the social phenomenon that is supposed to be correlated to *gothic novel\** should itself be conceptualized by means of a concept\*. But in the humanities as they presently are, and as they have always been, the overwhelming majority of these concepts take on their meaning from their being connected to a host of other concepts which are inevitably non-operationalized concepts. This may raise a sort of dilemma: either we operationalize the two correlated concepts as well as many other concepts in their semantic surroundings (possibly even all the concepts in the semantic surroundings) – but this leaves us somewhat puzzled, wondering whether such an operationalization on a large scale is a realistic task, and also what it would amount to exactly<sup>6</sup> –; or the correlated concepts\* run the risk of not being anchored to what gives them meaning, and of fluctuating – so to speak – in a sort of conceptual void. Let us illustrate the dilemma by means of an example. Consider the possible operationalization of the concept *gothic novel*: “a novel is *gothic\** if and only if it is written after 1790 and it includes at least two of the following elements: ruins, castles or monasteries, subterranean passages, dark battlements, hidden panels, and trapdoors”. Suppose we find the (quite unsurprising) correlation between gothic novels\* and, say, the issue of degeneration. Strictly speaking, it would be impossible to verify the correlation, unless we operationalize the concept of degeneration. Notice that

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<sup>6</sup> One could wonder, for instance, whether the results could still be regarded as answers to our *initial* questions and interests.

we could not be satisfied with something like “degeneration\* is a process of deviation from human nature”, since that wouldn’t be precise enough to be verified. On the one hand, this consideration could get us to embark on a snowballing process of new operationalizations. We would first need a concept of *human nature\**. And other and other new concepts\* as well. At a certain point, we could perhaps confirm (or disconfirm) the following claim: *gothic novels\** put into *question\** the very *idea\** of *man\** and its *nature\**. Suppose this is perfectly verifiable (or falsifiable). But is the formulation of such a claim a realistically attainable goal? (And was that really what we wanted?) On the other hand, suppose that, with the aim of avoiding this puzzling and perhaps even unreasonable consequence, we operationalize only the “target” concepts: besides the concept of gothic novel, suppose we operationalize only the concept of degeneration. In this case, a different problem arises concerning the *meaning* of the concept\* in question: while *degeneration* is semantically (i.e., inferentially) embedded into a cluster of non-operationalized concepts (normally, inferential relations partly determine the meaning of a word: for example, the inference “there is a dog, therefore there is an animal” is partly constitutive of the meaning of the word “dog”), this does not seem to apply to *degeneration\**, for its meaning is fully determined, by hypothesis, by the operationalization (or, which is the same, by the fully explicit annotation rules). In this sense, *degeneration\** could end up fluctuating in a sort of conceptual void, as it would not be well-anchored in its semantic web.

### Modest (Goldilockean) Conclusions

We would like to add two comments, one on the nature of the operational project, and one on its possible consequences. As to the first issue, the strong operational project seems to be prompted, among other things, by a revisionary attitude with respect to the history of ideas as it has been done until now. The request for full explicitness and testability contains an implicit criticism of the way in which the history of thought has usually been pursued. There is nothing necessarily wrong with this revisionary attitude. We only want to remark that this is not our attitude. But this is connected to the second comment. If one overly insists on the explicitness and testability constraints, a possible consequence is that of restricting the domain of the questions that can be asked, of the topics that can be investigated, and that for the simple reasons that some questions or some topics may come out as unsusceptible of such treatment, if not in principle, at least in practice. In other words, there is the risk that questions and topics be dictated by the method.<sup>7</sup> On our part,

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<sup>7</sup> In the field of digital humanities, a method-driven approach has been often taken for granted, more or less implicitly. As a consequence, the debate focused more on the question



we have always been interested in a methodological approach in which the introduction of quantitative methods in the history of philosophy stimulates or suggests new questions, which would be unanswerable by means of the traditional methods. We wanted to ask more questions, not less, and that is why we thought it useful to make recourse to quantitative methods.

All we have done until now is raising some perplexities. Do we have some positive and fully worked-out conclusions? Not really. All we can put forward is a modest proposal, or – if you prefer – a sort of rather trivial (almost philistine) methodological rule of thumb. It can also be regarded as a sort of “provisional morality”, in Descartes’s spirit, to be adopted while waiting for a more carefully thought-out verdict. Or perhaps it would be better to speak of a provisional moral of our tale. And the provisional moral is suggested by a real tale, the tale of *Goldilocks and the Three Bears*: on a table in the home of the three bears Goldilocks finds three bowls of porridge, at different temperatures. She tastes the porridge from all of them and she concludes – wisely if not exactly surprisingly – that she prefers neither the porridge that is too hot, nor the one that is too cold, but the one that “has just the right temperature”. We can say more or less the same thing in a more dignified way with Aristotle: “It is the mark of an educated man to look for precision in each class of things just so far as the nature of the subject admits” (*EN* 1094b24).

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of how to find a shared agenda and how to make the data interoperable (see, e.g., Kuhn and Reiter 2015), than on the substantial questions that could be addressed by means of quantitative methods.

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